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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,990	01/29/2004	Terence W. Barrett	3381-Z	2861

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EXAMINER	
SAMUEL, DEWANDA A	

ART UNIT	PAPER NUMBER
2616	

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01/22/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,990	BARRETT, TERENCE W.	
	Examiner	Art Unit	
	DeWanda Samuel	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *10 and 11* is/are allowed.

6)☒ Claim(s) *1-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 August 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. **Claim 1** recites the limitation "the spectral efficiency"", "the channel" , "the time-bandwidth product" and " the eigensignal" in line 4-10. There is insufficient antecedent basis for this limitation in the claim.

Claim 6 recites the limitation " the spectral efficiency"", "the channel", "the time-bandwidth product" and " the eigensignal" in line 4-10. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. **Claims 1-4 and 6-8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Feher (US patent 6,470,055) in view of Ralf Haas et al. ("Time-frquency well localized pulse for Multiple Carrier Transmission").

With regard to claim 1, Feher discloses having a *method for increasing the effective communications channel bandwidth beyond that of the constrained physical bandwidth, and thereby increasing, the spectral efficiency and the data rate of the channel, and/or the power efficiency of the channel,* Feher discloses having a spectrally efficient FQPSK, FGMSK, and FQAM for enhanced performance CDMA, TDMA, GSM, OFDM, and other systems (title). Feher further discloses the 2nd generation of FQPSK systems with Adaptive Antenna Arrays (AAA(and adaptive Feher Equalizers (FE) and smart diversity systems has additional enhanced spectral /RF power efficiency and end-to-end performance advantages (abstract).

Feher does not explicitly discloses *by orthogonal signal spectrum overlay (OSSO) comprising: decomposing the time- bandwidth product (TBP) of a given symbol in a data stream transmitted through a given physical bandwidth, non-linearly expanding said TBP in terms of an orthogonally overlaid signal basis set constituting the eigensignals of said symbol.* Haas et al. discloses having a product ("TBP") of a

polynom and a Gaussian pulse ("symbol")... the product is achieved orthogonally through a ambiguity function of H(t) ("non-linearly expanding", page 9 line 3-5).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have a spectrally efficient FQPSK, FGMSK, and FQAM for enhanced performance CDMA, TDMA, GSM, OFDM, and other system as taught by Feher processing a product (TBP") derived from a polynom and a Gaussian pulse ("symbol") as taught by Haas et al. efficiently reducing intersymbol interference.

With regard to claim 2, in combination Feher and Haas et al. teaches the method recited in claim 1. *wherein the number of orthogonal signals obtained in a specific symbol is set by the size of the TBP of the symbol.* However, Feher does not discloses wherein the number of orthogonal signals obtained in a specific symbol is set by the size of the TBP of the symbol. Haas et al. discloses base functions being orthogonal and normalized (page 8 paragraph 7).It is inferred the signals are orthogonal and are set to equal a normalized size.

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have a OFDM signals (column 13 line 33) as taught by Feher orthogonal and normalized signals as taught by Haas et al. to reduce intersymbol interference.

With regard to claim 3, in combination Feher and Haas et al. teaches the method recited in claim 1.*wherein the orthogonally overlaid signal basis set are Weber-Hermite (WH) functions and the number of WH signals obtained in a specific symbol is set by the size of the TBP of the symbol.* However, Feher does not discloses explicitly having orthogonally overlaid signal basis set are Weber-Hermite (WH) functions and the number of WH signals obtained in a specific symbol is set by the size of the TBP of the symbol. Haas et al. discloses having a multicarrier modulation technique whereby splitting up the large bandwidth occupied by a high symbol rate into a low rate subchannels with small bandwidth (abstract) . Haas et al. further discloses having a Hermite functions and that the signals are equal to its Fourier transform (TBP, page 8)

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have a OFDM signals (column 13 line 33) as taught by Feher processed in a Hermite function as taught by Haas et al. efficiently reducing intersymbol interference.

With regard to claim 4, in combination Feher and Haas et al. teaches the method recited in claim 1. *wherein the complete data stream is multiplexed to produce a plurality of data channels, each of which is encoded on orthogonal signals.* Feher discloses having a plurality of input signals ("data stream", column 13 line 28-31). Feher further discloses having a channel multiplexer (column 26 line 51-55). It is inferred the channel multiplexer multiplex input signals.

With regard to claim 6, Feher discloses having a *system for increasing the effective communications channel bandwidth beyond that of the constrained physical bandwidth, and thereby increasing efficiency and the data rate of the channel, ,* Feher discloses having a spectrally efficient FQPSK, FGMSK, and FQAM for enhanced performance CDMA, TDMA, GSM, OFDM, and other systems (title). Feher further discloses the 2nd generation of FQPSK systems with Adaptive Antenna Arrays (AAA) and adaptive Feher Equalizers (FE) and smart diversity systems has additional enhanced spectral /RF power efficiency and end-to-end performance advantages (abstract).

by orthogonal signal spectrum overlay (OSSO) comprising: means for decomposing the time-bandwidth product (TBP) of a given symbol in a data stream transmitted through a given bandwidth, non-linearly expanding said TBP in terms of an orthogonally overlaid signal basis set that constitute the eigensignals of said symbol within a set channel. Haas et al. discloses having a product of a polynom and a Gaussian pulse ("symbol")... the product is achieved orthogonally through a ambiguity function of H(t) (page 9 line 3-5).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have a spectrally efficient FQPSK, FGMSK, and FQAM for enhanced performance CDMA, TDMA, GSM, OFDM, and other system as

taught by Feher processing a product derived from a polynom and a Gaussian pulse ("symbol")

With regard to claim 7 the system claim is interpreted and rejected on the same grounds as method claim 3

With regard to claim 8 the system claim is interpreted and rejected on the same grounds as method claim 4.

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Feher (US patent 6,470,055) and Ralf Haas et al. ("Time-frequency well localized pulse for Multiple Carrier Transmission") as applied to claim 2 above, and further in view of Zou et al. ("COFDM: An Overview", 1995).

With regard to claim 5 in combination Feher and Haas et al. teaches the method recited in claim 2. *wherein OSSO symbols and associated orthogonal signals are transmitted in quadrature format (I and Q) and is the result of the addition of orthogonal signals, each of which constitutes a separate but overlaid communication channel, all occupying the same physical bandwidth.* Feher discloses having in phase

(I) and quadrature phase (Q) baseband signals (Abstract). However, Feher does not explicitly disclose OSSO symbols and associated orthogonal signals are transmitted in quadrature format (I and Q) and is the result of the addition of orthogonal signals, each of which constitutes a separate but overlaid communication channel, all occupying the same physical bandwidth. Zou et al. discloses having parallel data transmission and multiple carriers...each subchannel is modulated with a separate symbol ("OSSO symbol") and then the N subchannels are frequency division multiplexed whereby utilizing the same band (page 2 column 1 paragraph 3.1 and column 2 paragraph 1-3).

Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention was made to have a in phase (I) and quadrature phase (Q) baseband signals as taught by Feher utilize by symbol ("OSSO symbol") and modulated data ("orthogonal signals") transmitted N subchannels are frequency division multiplexed whereby utilizing the same band as taught by Zou et al. whereby making the implementation more cost effective.

With regard to claim 9, the system claim is interpreted and rejected on the same grounds as method claim 5.

Allowable Subject Matter

7. **Claims 10 and 11** are allowed.

Prior Art

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Boccuzzi et al. (US patent 6,778,514) discloses have a subspace combination of multisensor output signals .

Besidas et al. (US Patent 6,608,874) discloses having a method and apparatus for quadrature multi-pulse modulation of data for spectrally efficient communication.

Barton et al. (US patent 6,654,431) discloses having a multicarrier personal access communication system.

Loecher et al. (US PGPUB 2003/0014226) discloses having a method and apparatus for providing a polynomial based virtual age estimation for remaining lifetime prediction of a system.

Gudmundson et al. (US Patent 5,790,516) discloses having a pulse shaping for data transmission in an orthogonal frequency division multiplexed system.

Dress et al. (PG PUB 2002/00808889) discloses having pulse transmission transceiver architecture for low power communications.

Alard (US Patent 6,278,686) discloses construction of a multicarrier signal.

Holmqvist (PG PUB 2003/0157905) discloses having a transmitter and associated method for reducing the adjacent channel power during wireless communication.

Archer (US patent 5,640,423) discloses having a method for signal transmission using spectrally efficient orthogonal modulation.

Walton et al. ("Hermite Wavelets for Multicarrier Data Transmission") discloses having multicarrier modulation (MCM) is a technique which uses multiple simultaneous orthogonal carriers.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DeWanda Samuel whose telephone number is (571) 270-1213. The examiner can normally be reached on Monday- Thursday 8:30-5:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Q. Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DeWanda Samuel
1/16/2008

RICKY Q. NGO
SUPERVISORY PATENT EXAMINER